New Frontiers Presolicitation Conference
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NASA Headquarters

Outline

- Approach
- Science Review
- Details of the NF Opportunity
- Potential Missions Overview

Approach

- NAS Report Received 11 July
- Recommended 5 “Medium Class” Missions
- Now reviewing these missions
  - –Cost
  - –Technology Readiness Level

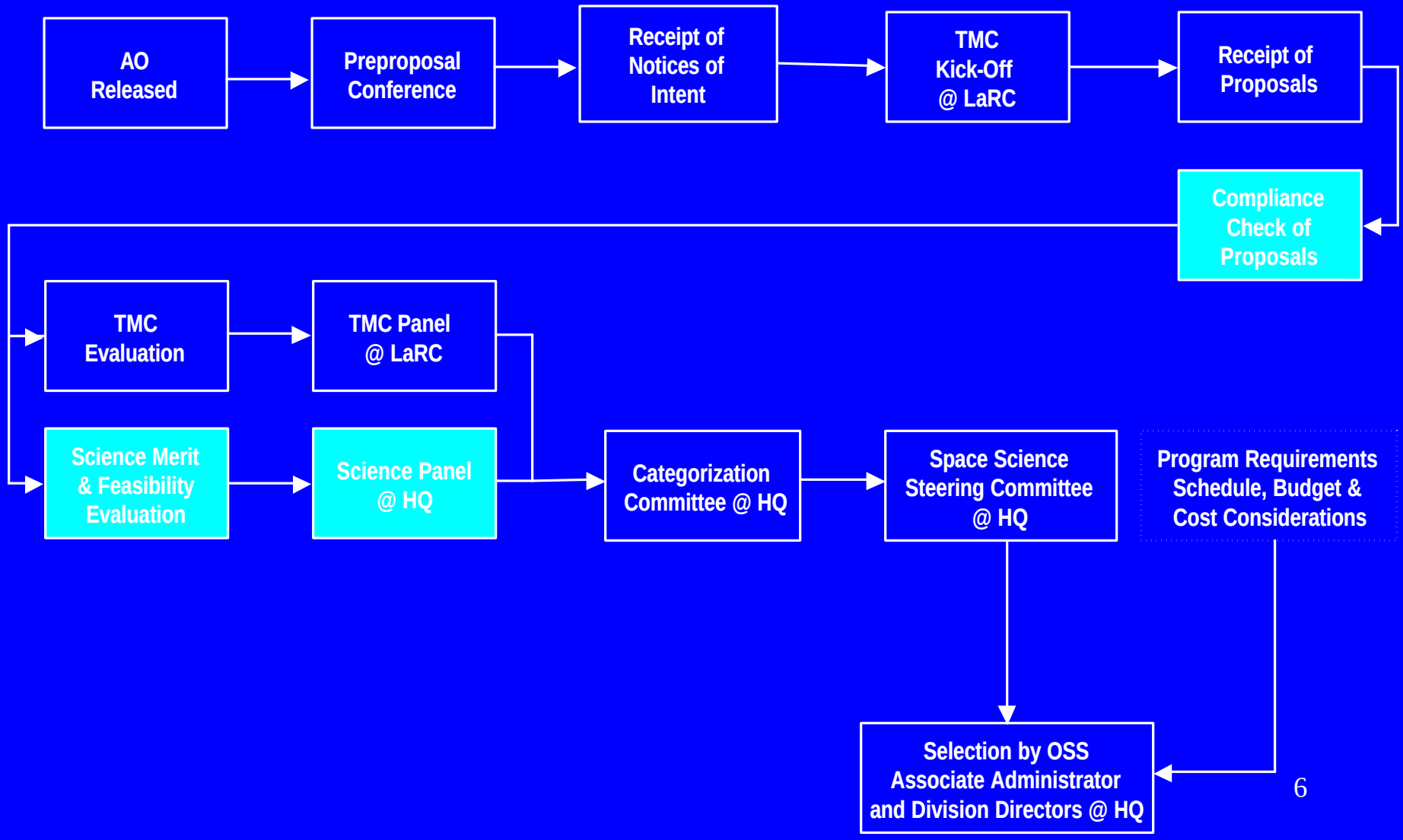
Approach (continued)

- Will go forward in this AO with between 2 and 5 of the Recommended missions
- May use Science Definition Teams to examine some Mission Scenarios
- Opportunity will focus on Science
  - Goals and Objectives
  - Not required to follow any Straw-man mission Design
  - Required only to substantially achieve goals and objectives

Approach (continued)

- Evaluation Process will follow Discovery/ Mars Scout Models
- Selection process must be Science Driven

Proposal Evaluation & Selection Process (Science Highlight)



Science Selection

- Peer Review
- Evaluation based on Description of Science in the proposal
- To what extent do goals and objectives of Investigation achieve “Scientific Goals and Objectives” Identified in AO?
- Includes increase in our scientific knowledge of the proposed mission target

New Frontiers Program Overview

- FY 2004 President's Budget Request (Real Year Dollars)
  - FY 03: $ 15.0 M
  - FY 04: $155.0 M
  - FY 05: $240.0 M
  - FY 06: $245.0 M
  - FY 07: $265.0 M

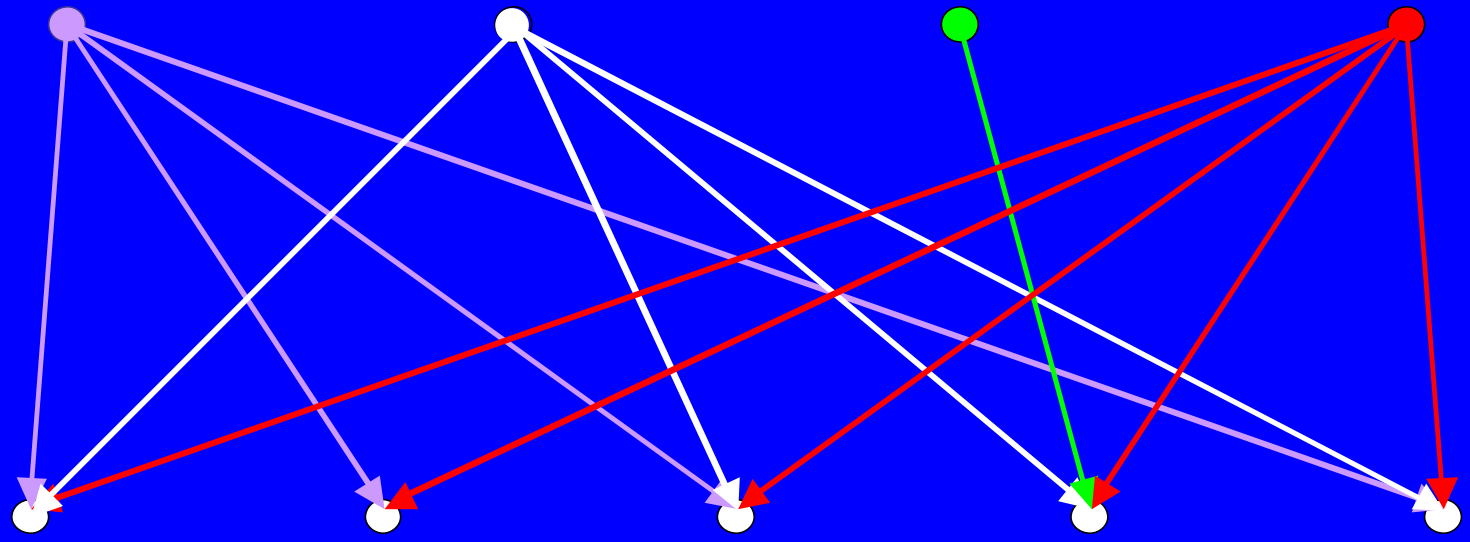
- Cost Capped at $650 M in FY 03 Dollars

New Frontiers Program

- Launch NLT 31 January 2009
- CAP Phase C/D costs at $410M
- Missions of Opportunity
  - $35M Cap
  - Launch by early 2008
  - Commitment from sponsoring organization by 30 April, 2004

SURVEY THEMES

The First Billion Years of Solar System History	Volatiles and Organics: The Stuff of Life	The Origin & Evolution of Habitable Worlds	Processes: How Planets Work



1) Kuiper Belt-Pluto Explorer	2) Lunar South Pole-Aitken Basin Sample Return	3) Jupiter Polar Orbiter with Probes	4) Venus In-Situ Explorer	5) Comet Surface Sample Return

Increasing Technical Challenge

Missions: Key Scientific Questions:

Kuiper Belt / Pluto (KBP)

A flyby mission of several Kuiper Belt objects, including Pluto/Charon, to discover their physical nature and determine the collisional history of the Kuiper Belt.

- **What processes marked the initial stages of planet formation?**
- **How did the impactor flux decay during the solar system's youth, and in what ways(s) did this decline influence the timing of life's emergence on Earth?**
- **How do the processes that shape the contemporary character of planetary bodies operate and interact?**
- **What does our solar system tell us about the development and evolution of extrasolar planetary systems, and vice versa?**

Kuiper Belt / Pluto (KBP)

GOALS:

- **Investigate the diversity of the physical and compositional properties of Kuiper belt objects**
- **Perform a detailed reconnaissance of the properties of the Pluto-Charon system**
- **Assess the impact history of large (Pluto) and small KBOs**

Missions: Key Scientific Questions:

South Pole Aitken Basin Sample Return (SPA-SR)

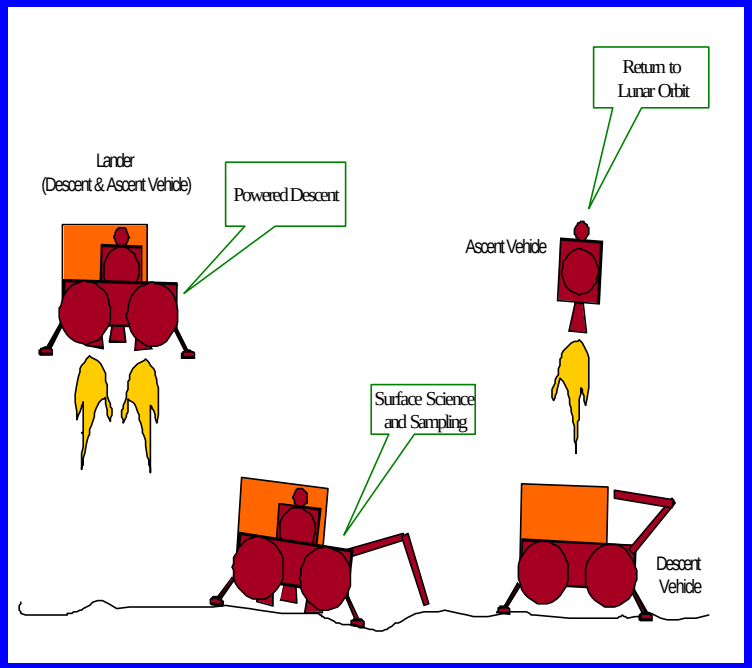
A mission to return samples from the solar system's deepest crater, which pierces the lunar mantle.

- **What processes marked the initial stages of planet formation?**
- **How did the impactor flux decay during the solar system's youth, and in what ways(s) did this decline influence the timing of life's emergence on Earth?**
- **How do the processes that shape the contemporary character of planetary bodies operate and interact?**

South Pole Aitken Basin Sample Return (SPA-SR)

GOALS:

- **Obtain samples to constrain the early impact history of the inner solar system**
- **Assess the nature of the moon's mantle and the style of the differentiation process**
- **Develop robotic sample acquisition, handling, and return technologies**



Missions: Key Scientific Questions:

Jupiter Polar Orbiter with Probes (JPOP)

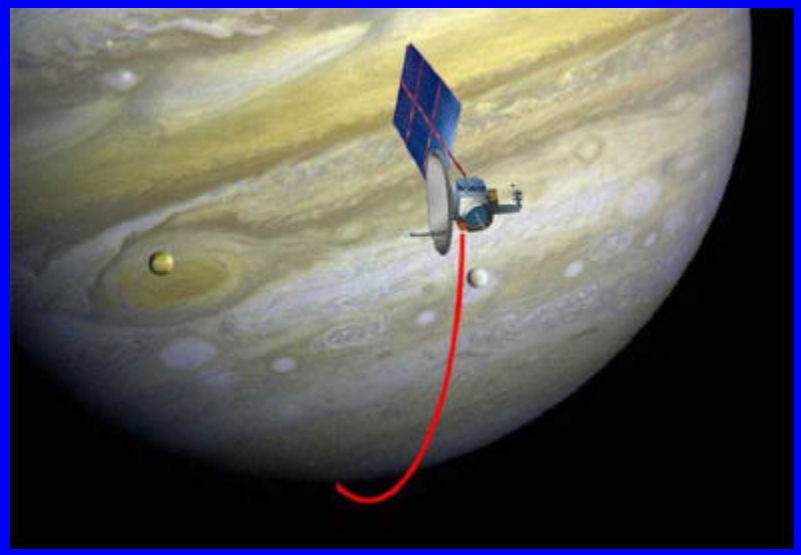
A close-orbiting polar spacecraft equipped with various instruments and a relay for three probes that make measurements below the 100+bar level.

- **Over what period did the gas giants form, and how did the birth of the ice giants (Uranus, Neptune) differ from that of Jupiter and its gas-giant sibling, Saturn?**
- **What is the history of volatile compounds, especially water, across our solar system?**
- **How do the processes that shape the contemporary character of planetary bodies operate and interact?**
- **What does our solar system tell us about the development and evolution of extrasolar planetary systems, and *vice versa?***

Jupiter Polar Orbiter with Probes (JPOP)

GOALS:

- Determine if Jupiter has a central core to constrain ideas of its formation
- Determine the planetary water abundance
- Determine if the winds persist into Jupiter's interior or are confined to the weather layer
- Assess the structure of Jupiter's magnetic field to learn how the internal dynamo works
- Measure the polar magnetosphere to understand its rotation and relation to the aurora



Missions: Key Scientific Questions:

Venus In-situ Explorer (VISE)

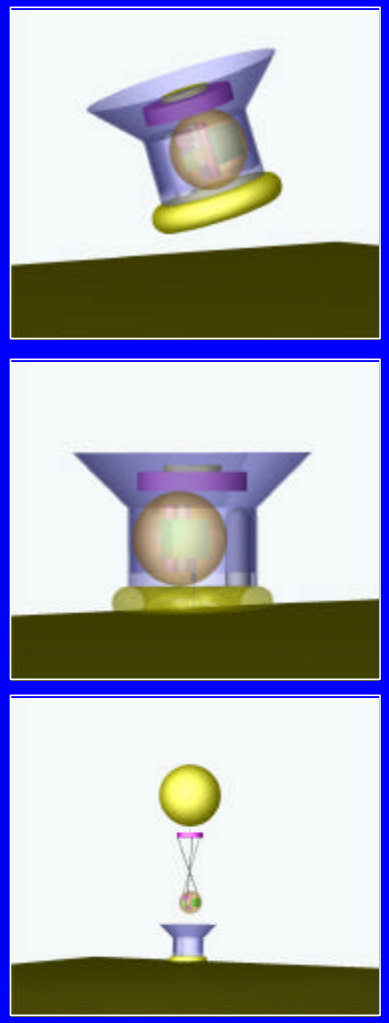
A core sample of Venus will be lifted into the atmosphere for compositional analysis; simultaneous atmospheric measurements.

- **What global mechanisms affect the evolution of volatiles on planetary bodies?**
- **Why have the terrestrial planets differed so dramatically in their evolutions?**
- **How do the processes that shape the contemporary character of planetary bodies operate and interact?**

Venus In-situ Explorer (VISE)

GOALS:

- Determine the compositional and isotopic properties of the surface and atmosphere
- Investigate the processes involved in surface-atmosphere interactions
- Elucidate the history and stability of Venus's atmospheric greenhouse



Missions: Key Scientific Questions:

Comet Surface Sample Return (CSSR)

Several pieces of a comet's surface will be returned to Earth for elemental, isotopic, molecular, mineralogical, and structural analysis.

- **What processes marked the initial stages of planet formation?**
- **What is the history of volatile compounds, especially water, across our solar system?**
- **What is the nature of organic material in our solar system and how has this matter evolved?**
- **How do the processes that shape the contemporary character of planetary bodies operate and interact?**

Comet Surface Sample Return (CSSR)

GOALS:

- Return near-surface cometary materials to Earth for detailed compositional, isotopic, and structural analysis
- Assess the detailed organic composition of the cometary nucleus
- Assess the porosity and other physical properties of nuclear material
- Assess the physical relationship among volatiles, ices, organics and refractories and their relationship to porosity
- Assess the isotopic and mineralogic content at both microscopic and macroscopic scales
- Assess the detailed organic composition of the cometary nucleus